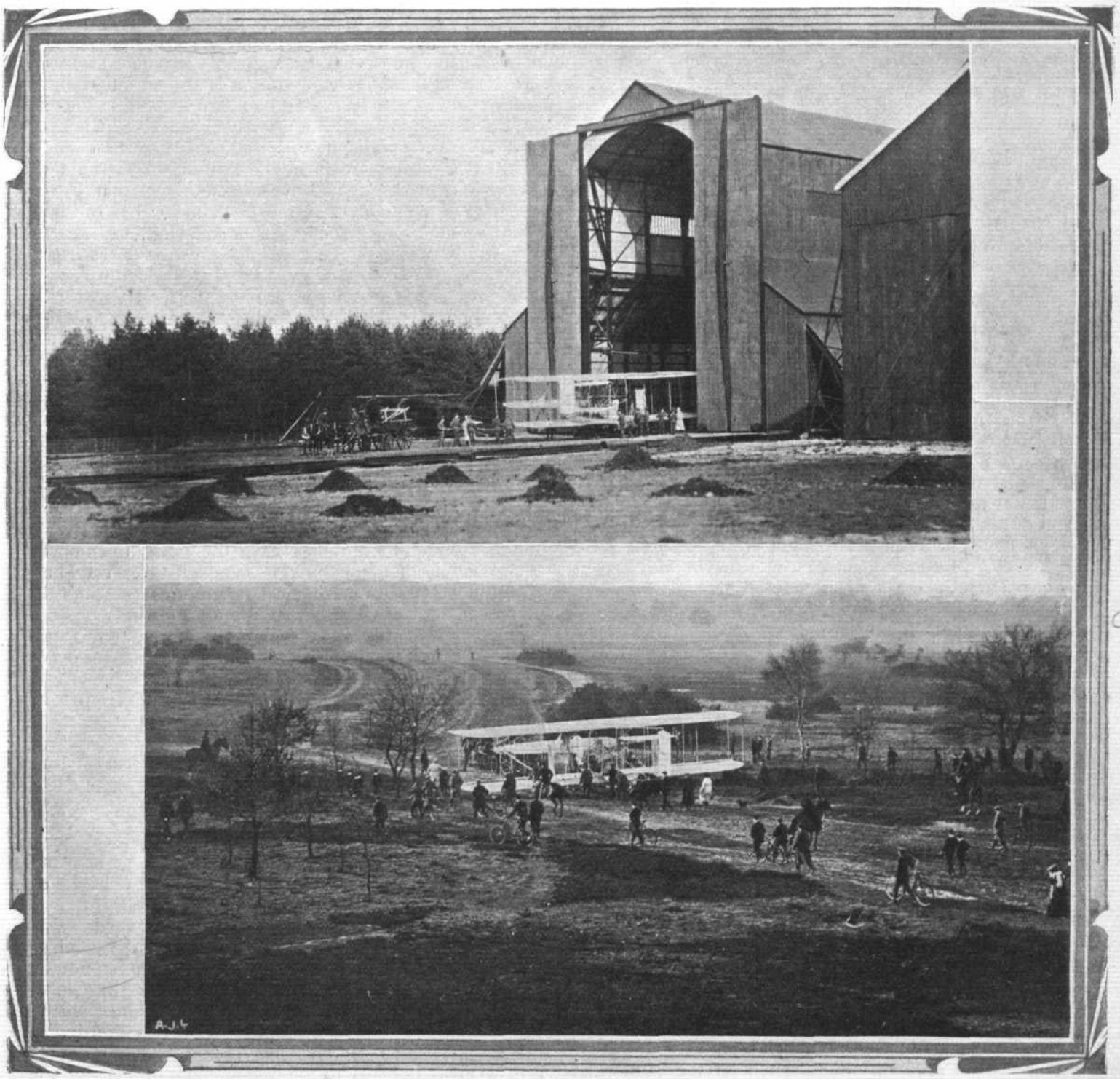
Flight

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE AERO CLUB OF THE UNITED KINGDOM.

No. 9. Vol. I.] FEBRUARY 27TH, 1909. [Registered at the G.P.O. as a Newspaper.] [Weekly. Price 1d. Post Free, 1½d.



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THE BRITISH ARMY AEROPLANE.—In the above photographs the British Army aeroplane is seen leaving its shed at Aldershot, and being taken down to Laffan's Plain for a trial on Thursday, February 18th. The lower photograph gives a very good idea of the difficulties which have to be contended with in getting the aeroplane on to its trial ground.

FLIGHT.

44, ST. MARTIN'S LANE. LONDON, W.C.
Telegraphic address: Truditur, London. Telephone: 1828 Gerrard.

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AN INVALUABLE CONTRIBUTION TO POPULAR KNOWLEDGE.

COMMENCING with the present issue, we are reproducing at considerable length a very valuable paper which was read before the American Society of Mechanical Engineers, by Major G. O. Squier, of the U.S.A. Army Signal Corps. We call particular attention to it, lest it should in any way escape the notice of readers, merely because (as is customary in such cases) it is printed in smaller type by us. But for its great length, we might have felt tempted to give it even greater prominence in this respect in our columns, since it appears to us to supply a very real want which is now being felt by the majority of those who are taking a keen interest in aeronautics. Comprehensive in scope, simple and straightforward in expression, albeit backed up by the required mead of technical accuracy and treatment, Major Squier's paper fills the bill to a remarkable extent as a carefully prepared retrospect—up to the time when it is easy for present day articles to take up the running—of past progress in matters relating to aviation. Primarily, the paper is written from a military standpoint; but that fact does not in the least detract from its general all-round interest. Its width of outlook is such that it includes salient data concerning most of the successful airships and "fliers" which have heretofore been built, as well as frequent interpositions that deal in a most enlightened and broad-minded manner with the main principles which affect the construction and design of the various aerial craft that the author refers to. Its general tone is such that it constitutes a fascinating story, well calculated to rivet the attention of the frankly merely curious; and this in spite of the substantial undercurrent of cold, hard, technical facts which forms the true foundation of the paper. We have spoken of it as a retrospect of past doings; and, even if it were no more than that, it would be singularly welcome at this early stage of the flying era. But it is also an intelligent forecast of things to come, and of future requirements; so that its utility just now is greatly enhanced in consequence. The paper is, indeed, well calculated to dispel such lethargy as there is in the attitude of the public towards aeronautics; and we therefore feel that it is deserving of the greatest degree of publicity that can be given to it. From some points of view, we would suggest that it should be ranked by readers of FLIGHT in much the same category as the articles which we ourselves are giving under the heading "How Men Fly;" for it unquestionably brings to light in an easily assimilated form much of that fundamental knowledge which thousands of people in the United Kingdom are now seeking for. Then, too, the bearing which it has upon the military outlook of the future is in itself bound to attract a considerable amount of notice. Major Squier has a good deal to say upon the various questions which came up before the Peace Conference at the Hague—matters affecting those further international laws that are inevitable—and, needless to say, he discusses them as a military expert. Even in the abstract, these things have the power to compel the attention of every thinking man, whatever may be his attitude towards mechanical progress as mechanical progress; but considering that the author winds up by giving actual specifications which have been drawn up by the U.S.A. Signal Corps for aeroplanes and for dirigibles, an unmistakable strain of reality is imparted which adds enormously to the weight which this paper carries with it.

AERO CLUB FLYING GROUND.

JUST as we go to press, we learn that the Committee of the Aero Club, after a most careful search, have concluded their arrangements for acquiring their flying ground at Shellbeach, in the Island of Sheppy. The ground is in every way suitable for the purpose, and an uninterrupted flight of over 10 miles in a straight line may be obtained, with a considerable expanse of country for circling. Also it is bordered on one side by the sea, and at low water there is a large extent of hard sand available. It is very accessible from London, as the express boat trains to Queenborough serve within a short distance of the ground, and members of the Club will find good Club accommodation, both sleeping and food, at the charming old house known as the Muscle Manor Also, for those flyers who may wish to have a permanent residence on the spot, the proprietors propose to at once commence the erection of bungalows.

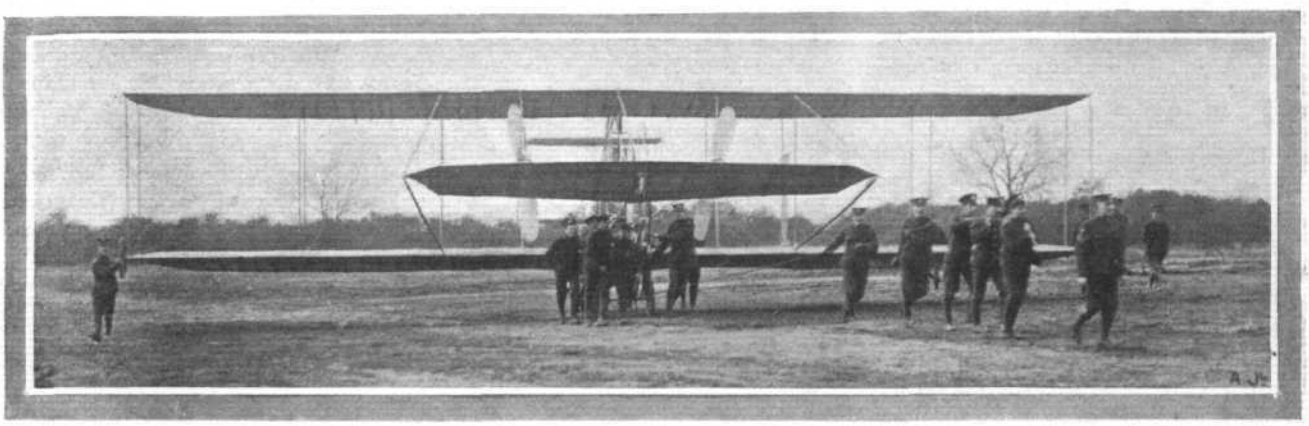
Immediate steps are being taken to erect sheds, and workshops are now being constructed by the Club's aeronautical engineers, while members will be permitted to erect their own sheds by arrangement with the Club. Many members are already constructing machines which will make flight trials on the Club ground very shortly.

The acquisition of this flying ground will no doubt give a great impetus to the development of aviation in this country.

THE BRITISH ARMY AEROPLANE.

SOME IMPRESSIONS AND COMPARISONS.

AFTER a period of enforced retirement, brought about by the disastrous termination of a previous trial flight, the British Army aeroplane was again taken from its shed on Thursday of last week, February 18th, and some brief, but by no means uninteresting experiments were carried out on Laffan's Plain. It was not until the afternoon that the doors of the great balloon shed at South Farnborough were moved slowly and laboriously back along their guides, to expose a yawning cavern, out of which emerged, equally slowly, a diminutive white machine. Diminutive, that is, by comparison with its enormous house, for the British Army aeroplane is, as a matter of fact, a large machine, and once away from its shed—which is, of course, the rightful habitation of "Nulli Secundus"—its full dimensions can be better appreciated. It had been intended to make a trial flight in the morning, for the dawn was calm, but as the day grew older, so did a breeze spring up; and although the casual observer might have been pardoned for supposing that the conditions were perfect, as was the weather, the authorities very properly considered that it was useless to take risks until they knew more about the handling of their machine.



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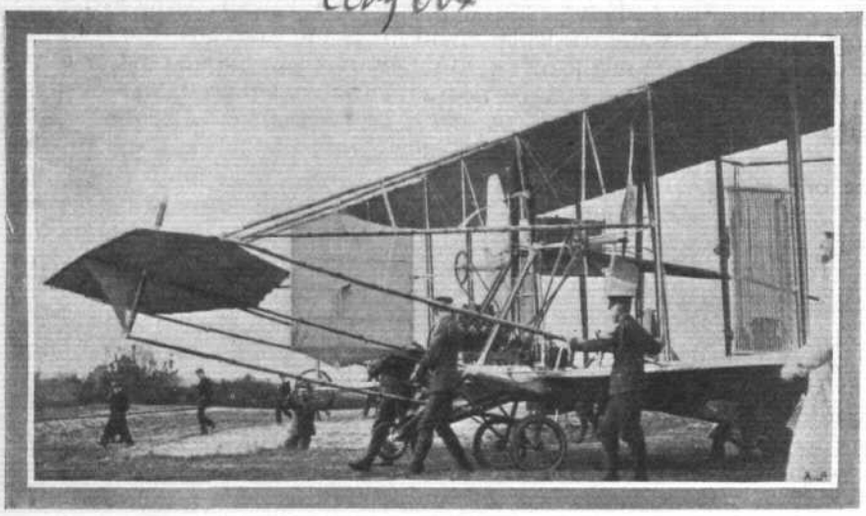
THE BRITISH ARMY AEROPLANE.—Hauling the machine on to Laffan's Plain. This view gives an excellent perspective of the front of the machine.

This decision may savour somewhat of the old chestnut about not going into the water before learning to swim, but, as a matter of fact, in the present stage of flight the art of learning how is almost as great as that of the art of flying itself. Being pitched overboard in a storm may be a very effective method of making a practical acquaintance with the water; but, just as most people would prefer to learn to swim in a calm sea, so do most aviators prefer to learn to fly on a still day. Of course, there is this fundamental difference, that whereas man can swim with his unencumbered body, he cannot possibly fly without the aid of a machine; and at first glance there would seem to be a closer analogy between flight and seamanship of the racing yachtsman than between flight and swimming. But from whichever point of view the situation be regarded, it seems to us very necessary never to overlook the important part which the individual sense of control possessed by the aviator may have in the mastery of the air with any particular machine. It may be possible ultimately to build a machine that will practically fly by itself, so to speak; but it seems reasonable to suppose that such an invention will only be brought about by an appreciation of innumerable little details which can only be revealed to those who set themselves the undoubtedly difficult task of learning to fly with the cruder machines which the brain of man is able to evolve *ab initio*.

Such evidence as has so far been afforded offers no grounds for supposing that the British Army aeroplane has any particular claim to belong to the category of what what might be styled the "self-flyers," but on the other hand we can see no particular reason to take a despondent view of its ultimate capabilities of flight. As a type, the British Army aeroplane is not unlike the Wright flyer, or rather it was not, until the latest addition of a small tail — formed by the superposition of the two planes which were formerly on either side of the elevator in front—removed it to a class of its own. On theoretical grounds—so far as there is any theory worth applying in these matters—this modification should result in an increase of the automatic longitudinal stability, on the grounds that if the machine tips fore and aft, the action of the wind upon the tail has a self-righting effect, whereas if there is no such horizontal surface at the rear, but only an elevator in front, the apparent automatic effect attributable to the presence of the latter surface is that of exaggerating any initial departure from an even keel.

It is, of course, a feature—it might almost be said *the* feature—of the Wright machine, that it has no tail, and it is mainly for this reason that it is commonly supposed that the art of using it in the early days of apprenticeship is greater than is the case with the Voisin aeroplane, which has a very fully-developed *empennage*. That the Wright machine can be flown satisfactorily by anyone who knows how, the Wrights themselves have shown to all the world, and that the difficulties are not great in themselves, may presumably be judged from the fact that Wilbur Wright has undertaken to make his three pupils proficient. Since the British Army aeroplane now has a tail, it can no longer be classed in the same category as the Wright aeroplane, nor can it justly be said to be similar to the Voisin aeroplane on that account, for the Voisin machines have essentially a larger tail, situated at a proportionately greater distance from the main surfaces. Various views have been expressed as to the utility of such a big tail, and although it seems to be admitted that it has very considerable steadying effects,

which is said to largely account for the comparatively rapid progress which untaught beginners make with these machines, it is also said to materially impede the rising qualities of the machine as a whole during the operation of starting a flight. The presence of a comparatively small tail on the British Army aeroplane, therefore, gives an individuality to this machine which makes its trials all the more interesting.



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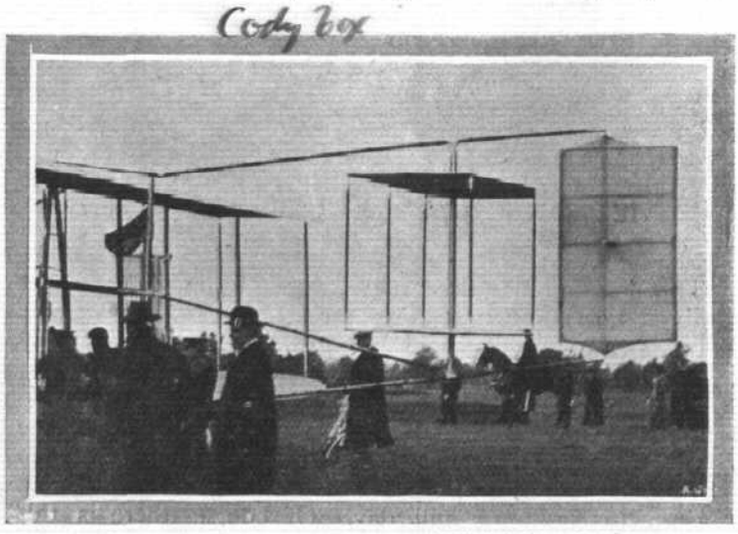
THE BRITISH ARMY AEROPLANE.—View of the fore part of the machine, showing the elevator, front rudder, and machinery. The vertical tubes on the right form part of the condenser.

The British Army aeroplane, in common with other biplanes, has an elevator in front and a rudder behind; but in addition to the latter there is a rudder in front also, and the two members work in unison. At present the tail is fixed, but later, experiments may be carried out with this member mounted on hinges, so that it can be worked in unison with the front elevator. If this is done it would of course afford an opportunity for carrying out comparative tests with the elevator and tail working in the same and contrary senses. If the front edges of both tail and elevator were to be raised simultaneously, the effect anticipated would obviously be the bodily lifting of the machine on an even keel, whereas if the tail were dipped while the elevator is tilted, so that both sets of planes are tangent to a common circle, the effect should be a rapid and immediate rise on an inclined keel to a higher altitude. Since the last accident, the outrigger framing carrying the elevator—which gave way in mid-air—has been strengthened by an additional pair of bamboo members.

There are not wanting, by the score, adverse critics of our army aeroplane, but it is surely early days to make disparaging comments on machines which are designed to achieve such an unknown quantity as flight. It is also equally absurd to suppose that Colonel Capper and his men are not doing their level best to win the day as quickly as may be, and it must at least be admitted that Mr. Cody very cheerfully risks his own neck in furthering their common object. They are conducting their trials under conditions which are certainly far from convenient; in fact, they are unfairly difficult. They are handicapped for funds, and that apparently to such an extent that they cannot even afford to build a shed on a ground which is suitable to practise flight. The workshop facilities at the balloon factory at South Farnborough may doubtless be a great advantage in the constructional stages, but it would surely be an economy of time and labour to have the machine installed on the aerodrome during its trials. The nearest ground of any pretensions to decent surface and reasonable extent around the balloon factory is Laffan's Plain, and to get the aeroplane transferred there not only occupies a small squad of men and a couple of horses the better part of an hour, but is attended with such risks of damage to the machine from the innumerable bushes, trees, posts, and fences which have to be negotiated, that it is almost a wonder that the machine ever arrives intact. Certainly it is entirely due to the smartness and alertness of the Royal Engineers belonging to this section that the feat is accomplished. As an instance of the difficulties of the task, it is interesting to recall the performance of a man who played "outside right" in charge of that wing of the aeroplane during its transit from the shed to the plain. He never left go of the bicycle wheel which is attached to the lower plane, yet he had to go through a thick furze bush, climb two fences without the use of his hands, and jump a ditch, in order to manœuvre his part of the machine to safety. Such performances as this may be all very well when regarded as field drill, but from the point of view of preparing for a trail flight, it seems a little unnecessary; moreover, the state of the wind may change materially in a very short time, and it is quite conceivable that a trial might be thereby frustrated before it could even be commenced.

Laffan's Plain itself is by no means an ideal aerodrome either. It may be as good as the majority this country can produce, but there is very little doubt that the authorities were well advised to build a slow-speed machine for use there. The British Army aeroplane is large, and it looks perhaps somewhat unwieldy, but Thursday's trials showed that it has an undoubted capacity for getting off the ground very nicely while travelling at quite a moderate rate of speed, and that it



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THE BRITISH ARMY AEROPLANE.—View of the rear part of the machine, showing the tail and stern rudder. The two planes constituting the tail were formerly on either side of the elevator. At present this tail is fixed, but later experiments may be made with it moving in unison with the elevator.

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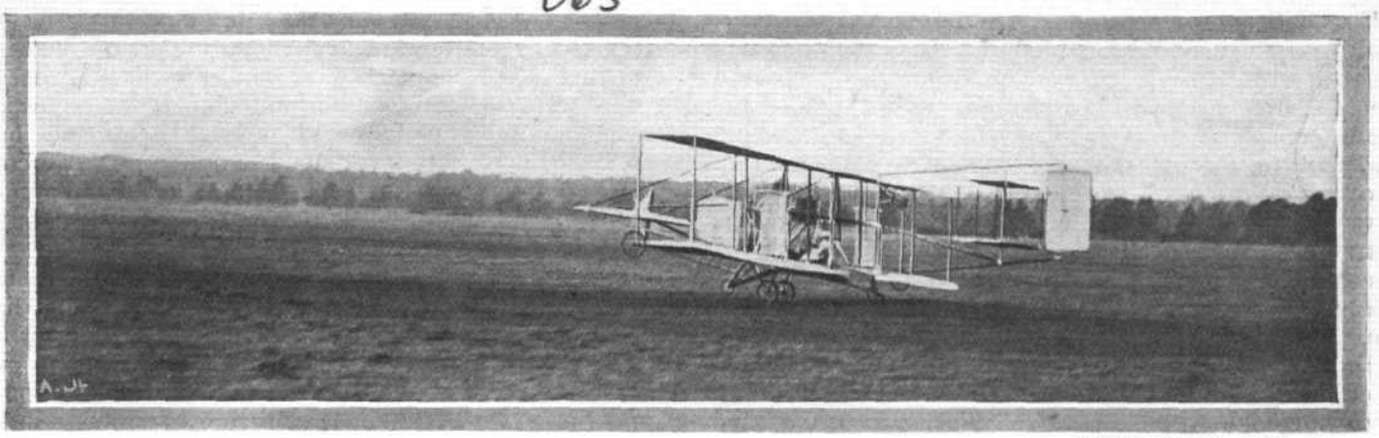


"Flight" Copyright Photo.

THE BRITISH ARMY AEROPLANE.—The above photograph was taken while the machine was in motion across the ground a few seconds after the start. Mr. Cody is at the wheel.

does not, therefore, run undue risks of being damaged while starting.

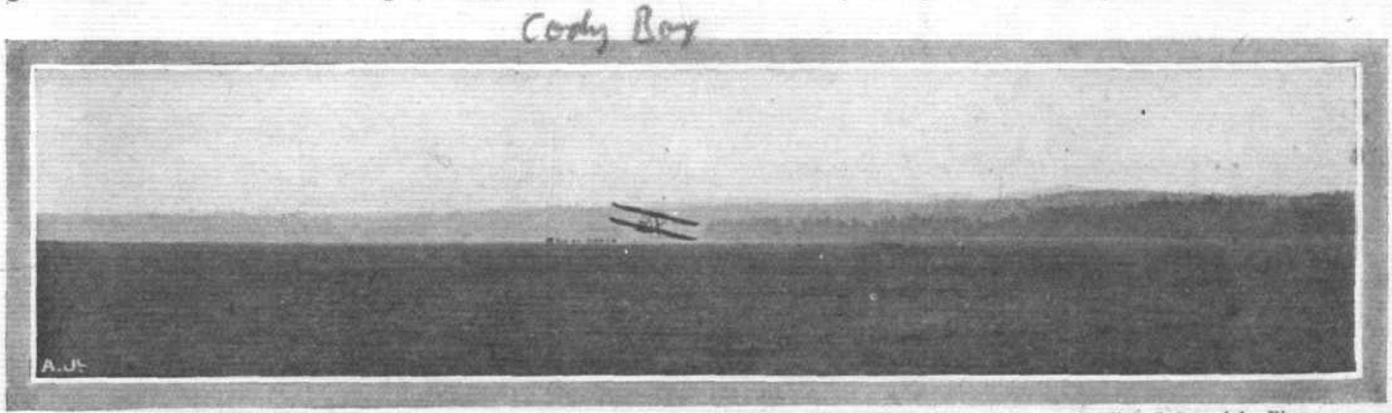
From a constructional point of view, flying machines of this kind will essentially appeal in different ways to the mechanical and unmechanical mind. The latter is inclined to argue, why have so many wires and stays all over the place, which get in the way and are so liable to be broken? There certainly are a great number of these members, but the engineer knows very well that it would be dangerous to leave out a few of them lest the others should break of their own accord. Our readers will doubtless remember that it was because of the inevitable wires that M. Esnault Pelterie decided to adopt a monoplane as a practical flyer after he had experimented with a Wright glider. Different engineers would doubtless have constructed such a machine as the army biplane on different systems, some using one material and some another, but it is questionable whether there would be a vast difference in the results. Possibly it might be preferable to use built-up hollow wood spars instead of bamboo poles for the outriggers, but questions of this sort are very largely influenced by finance, and it is therefore very difficult to find any just cause for that adverse criticism which has occasionally been directed against the British Army machine. Readers of our first article of the series "How Men Fly," will be interested to learn that the petrol-tank and all the struts between the two decks of the aeroplane have a torpedo-shaped section, with the blunt edge facing forwards.

In view of the unpropitious state of the wind, it was not intended, when the machine was taken out for the first time on Thursday, to make any attempt at an extensive flight with it, but two short flights were nevertheless accomplished, as incidental to the trials of the machine over the ground; and although quite short in duration, and carried out at an altitude of only a foot or so from the ground, they were far from being devoid of interest. From the spectator's point of view, the second of the two flights was the more important of the two, inasmuch as the machine was then approaching head-on against the wind. For a while it sailed along on an even keel, and without rolling in the least, but gradually the right wing rose higher than the left, until it seemed that the latter must certainly strike the ground and be wrecked. Just before landing, however, the machine partially righted itself and thus avoided any further damage beyond the bursting of a tyre on the outer wheel.

The impression which we received from watching the machine heel over was that it was being subjected to an uprising current of air, which had caught the right wing first, and thereafter continued to slowly but steadily upset the balance by its direct pressure. This is, of course, merely an impression received by watching the action of the machine; and we base it largely on the fact that the heeling over seemed to take place comparatively slowly, and in such a way that, had one been alongside the machine at the time, one would have felt tempted to pull the wing downwards by force.

There are, attached to the front edges of the lower planes, near their outer ends, righting sails, which take the place of the pivoted tips employed on some of the monoplanes; they are intended to act in the same way as warping the main planes themselves does on the Wright aeroplane. These sails are sheets of canvas, which normally lie flush with the surface of the planes, but can be inclined by lifting their rear edges as occasion requires.

Cody Boy



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THE BRITISH ARMY AEROPLANE.—The end of a flight. Just before landing the aeroplane tilted over on one side, and the above photograph was secured at this critical moment.

We cannot, of course, say what actual effect the operation of these sails may have had on the occasion in question, nor to what extent they were used for the purpose of righting the machine, but it seems to us that—taking into consideration their relatively small area in proportion to that of the total supporting surface, and having regard to the apparent slow velocity of the machine through the air — they could not well have been very effective under such circumstances; that is to say, assuming that the machine was indeed under the influence of a current of air having an upward trend. In a machine travelling at a relatively high velocity through the air, righting tips are doubtless all that is required, because the speed of the machine is such as to always leave enough virtual positive velocity to make them effective. With a slow-speed machine, however, it appears to us that the problem may be more complicated, inasmuch as changes in the direction of the air current may have a much greater effect. If, for instance, one end of an aeroplane is subjected to a relatively direct upward thrust at a time when the velocity of the machine as a whole through the air is not sufficient to make the righting tips effective, it naturally becomes a matter of import to consider whether some more positive and direct-acting means of restoring lateral equilibrium should not be experimented with. Possibly such difficulties as we have suggested may, if they are found to exist, be overcome by an arrangement of planes, and this would naturally seem preferable to any resort to moving weights; but in the meantime it certainly does seem desirable that some attempt should be made to observe the nature of the air currents during flight, in order that a little more may be known of the conditions under which failure alternates with success. While the British Army aeroplane is enforced to remain at South Farnborough, and those at work upon it are thereby restricted in the way that they are at present, it is, we fear, impossible to expect any really rapid progress of a permanent character; and it is to be earnestly hoped that means may be found whereby those at work on it may be placed in a position to keep in the van of progress, lest greater national expense be incurred in the future, when it may become imperative to make up leeway.

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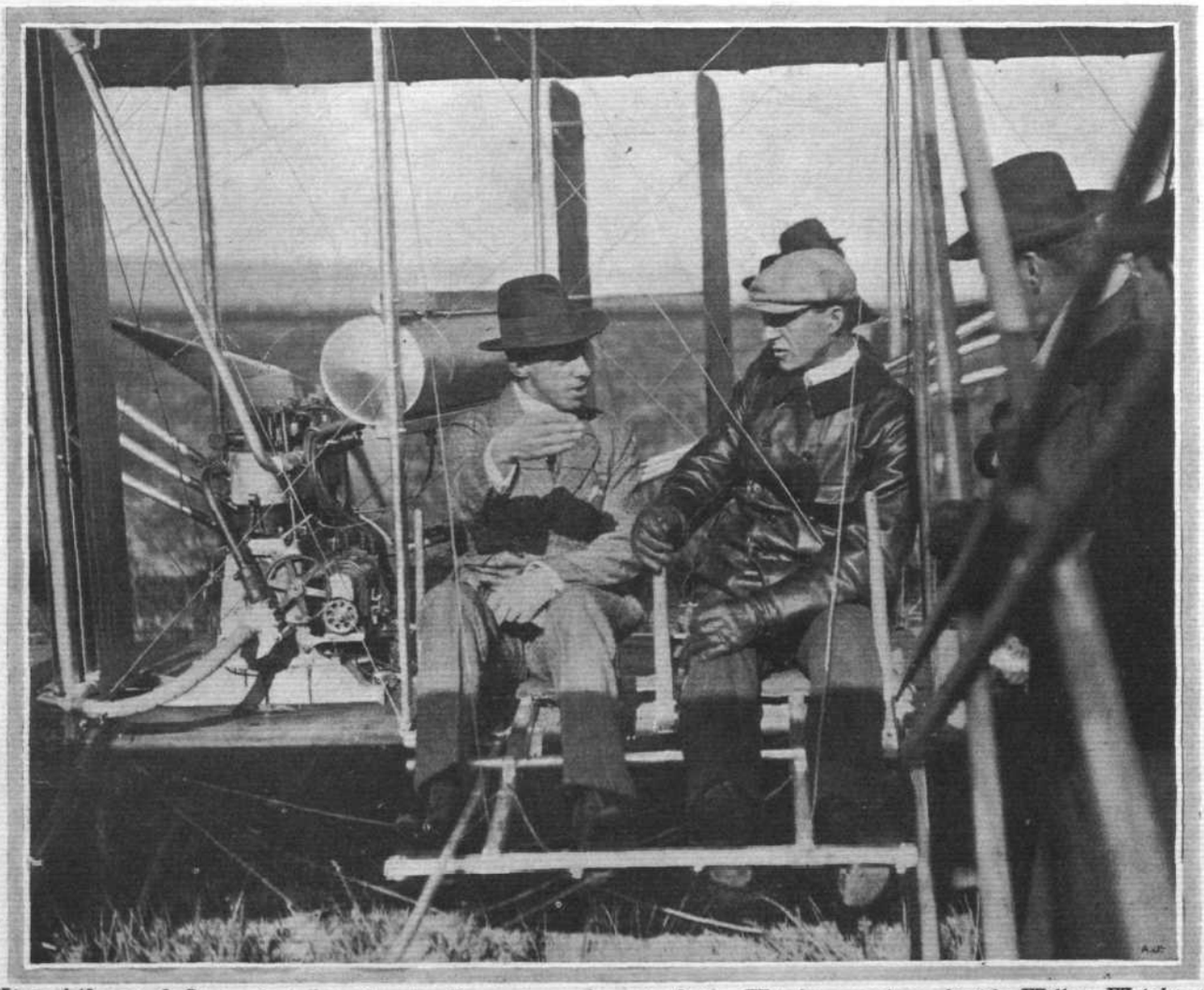
Paper Compound for Flying Machines.

Two German engineers, Dr. Wagner and Herr von Radinger, have invented a compound material formed of paper, raw silk, and other fabric bound up with steel wire, which they claim is exceptionally light and strong, and will be most suitable for all sorts of construction, including ships, and also for the framework of flying machines and airships. The material is said to be cheap, and proof against fire and damp. A practical demonstration with the material is to be given in the construction of an airship which the inventors are building at Stettin.



King Alfonso of Spain, last Saturday, in the passenger's seat of the Wright aeroplane, beside Wilbur Wright, the King of the Air, having the whole art of flying the machine explained to him by Wright.

NEWS OF THE WEEK.

The Aero Exhibition at Olympia—Success Already Assured.

DAY by day the general scheme for the Exhibition at Olympia, which opens on the 19th prox., has to be enlarged to keep pace with the applications for space which continue to be received. Originally the idea was to exhibit twelve aeroplanes in the centre of the main hall, but arrangements have now been made for the staging of the Wellman airship, fully-equipped, besides sixteen aeroplanes. At present the list of exhibitors includes M. Robert Esnault-Pelterie (R.E.P.), Soc. Gobron-Brillie (Breguet), C. E. Whittaker (De Pischoff et Koechlin), the Simms Manufacturing Co. (Voisin), Mass Cars, Ltd. (Delagrange), Mr. J. T. C. Moore-Brabazon (Voisin), the Wolseley Motor Co., Mr. Howard T. Wright, Short Bros., Lamplough and Sons, Mr. Jack Humphry, Capt. Windham, Mr. E. T. Wilson, Mr. Handley Page, Mr. G. M. Bonnet, and the Miesse Petrol Syndicate (de la Hault). It is not improbable, however, that this list will be considerably added to before the opening of the Exhibition, as a number of further applications are under consideration by the S.M.M.T. In addition to this collection of actual flying machines, there will be the large display of models, which is being organised by the Aero Club, besides exhibits of aerial engines, accessories, balloons, kites, &c.

British Army Aeroplane Flies 400 Yards.

FOLLOWING on the experiments made last week, which are dealt with at length on page 113, the British Army aeroplane, manned by Mr. Cody, on Monday of this week, made a flight of 400 yards at an altitude of about 12 feet from the ground. This flight was against the wind, and was carried out at a speed of about 10 or 12 miles an hour. It followed upon a flight of about 100 yards, which was carried out with the wind. Some slight damage was done to the machine at the conclusion of the trial.

On Tuesday Mr. Cody again had the machine out, and made several short flights. Two attempts at turning were made, and although Mr. Cody did not quite succeed in this, he turned the machine through a quarter-circle on one occasion before it touched the ground. The experiments were concluded without the slightest mishap.

Moore-Brabazon Continues his Success.

ON Wednesday of last week, Mr. Moore-Brabazon successfully continued his experiments at Issy. Taking his machine out of the shed at about a quarter past seven, he accomplished a circular kilometre almost before the half-hour had struck. Landing voluntarily, he started afresh and made a second circuit of the field, and then yet another without mishap. Everything was apparently in excellent trim for the accomplishment of a long flight, but Mr. Moore-Brabazon expressed himself as quite satisfied with his day's work, more especially as it had shown that a slight alteration in the position of the radiators had had the desired beneficial effect on the automatic stability of the machine. All being well, the next trials will be carried out at Chalons, where a new shed has been built to receive the machine, which was taken to Chalons from Issy last Monday afternoon on a motor lurry. In the meantime Mr. Moore-Brabazon is on a short visit to England.

King Alfonso and the Wrights.

So His Majesty Alfonso XIII of Spain did not make a flight with the Wrights after all, for, like a good many married men of less august degree, he found himself bound, so report has it, by a promise to Queen Eugenie Victoria that he would upon this occasion sink his personal desires in deference to her anxious fears for his safety. There is no doubt, however, that His Majesty managed to impart a great deal of interest into his part of spectator when he motored over to see Wilbur Wright fly, as he did on Saturday of last week, February 20th. Nothing contented him but that he should have the whole mechanism and the operation thereof fully explained to him, and that he might get a better appreciation of the reality of things, he absorbed his lesson seated on the machine with Wright beside him. The visit was paid to the aerodrome quite early in the morning; in fact, the King left his hotel soon after nine o'clock, motoring over in a 150-h.p. Delahaye belonging to M. Jose Quinones de Leon, the exhibition flights being concluded by half-past ten. Wilbur Wright elected to make a flight directly His Majesty arrived, and he remained in the air for 28 mins.; half of this time he was actually out of sight, and some of the spectators began to express fears of a mishap. Before landing, Wilbur Wright executed several figures of eight in front of the King, who was undoubtedly immensely impressed by the spectacle, and wholeheartedly congratulated the American on his wonderful accomplishment. His Majesty expressed a wish to see a passenger flight, and Wilbur Wright thereupon invited the Count de Lambert to accompany him on a flight which lasted twenty minutes. Before leaving the Pont Long ground, His Majesty honoured the Wrights by an invitation to lunch with him at the hotel, and it is said that they are to be created Commanders of the Order of

King Alfonso congratulating Wilbur Wright and his brother Orville immediately after Wilbur's first fine flight with a passenger, before His Majesty, last Saturday.

Isabel the Catholic. An officer of the Spanish Army will, in all probability, be entered as a pupil of the Brothers Wright, as the Spanish Government is said to contemplate purchasing one of these machines.

The Wrights at Berlin.

A RUMOUR is in circulation that the proprietors of the *Lokal Anzeiger*—who brought the Voisin aeroplane and M. Zipfel to Berlin—have arranged for the Wright Brothers to give a demonstration there next summer.

Wright's "Record" Speed-Kilometre.

ON February 18th, Wilbur Wright, accompanied by Count de Lambert, made some speed trials over a measured kilometre, and put up an average of 52 secs. for four attempts, which works out at a speed of approximately 70 k.p.h.

Wright Pupils on Their Own.

So satisfactorily have Wilbur Wright's three pupils progressed under his tuition, that it is anticipated they may be able to fly by themselves almost immediately. Yet all told, they have not been aloft more than a few hours with their master.

Wilbur Wright and Gordon-Bennett Aviation Cup.

THE American Aero Club has decided to be represented in the Gordon-Bennett Cup Race for aeroplanes, and hopes that Wilbur Wright himself may be induced to take part in their behalf.

M. Barthou Flies with Wright.

ONE of Wilbur Wright's latest passengers was M. Barthou, the French Minister for Public Works, who paid a visit to Pau on Monday of this week, and was taken up for five minutes or so in the flyer. The feature of the flight was an ascent to an altitude of about 90 feet.

Wilbur Wright's Busy Day with Pupils.

ON Tuesday last Wilbur Wright flew four times, and on each occasion was accompanied by a passenger. The first was a flight of twenty minutes, with Count de Lambert; then Miss Wright flew with her brother for eighteen minutes. Then Count Lambert went up again, and for the four minutes the master and student were aloft the latter was in charge of the "tiller." The concluding flight was one of five minutes with M. Tissandier, and he also manipulated the controlling levers during the trip.

Wright's Plans for the Future.

WRITING from Pau, Mr. H. Massac Buist confirms in detail the plans for the future which have been laid by the Brothers Wright, as reported from time to time in these columns. When the training of his three pupils has been completed, and the Weiller contract thereby satisfied—which it is anticipated will occur in a week or two, at latest—the two brothers will proceed to Rome, there to give demonstration flights and train one pupil, in accordance with an Italian contract. Thereafter, they will go to America to attend to the army contract, and subsequently to Germany, with which country they also have a contract. On the Continent Mr. Hart O. Berg represents them, but for England and America the Wrights act personally.

Eleven Wright Aeroplanes to be Delivered in May.

M. CLEMENCEAU, who has the agency for the Wright aeroplanes, has sold eleven machines for delivery to private owners before the end of May.

Hon. C. S. Rolls to Own a Wright Machine.

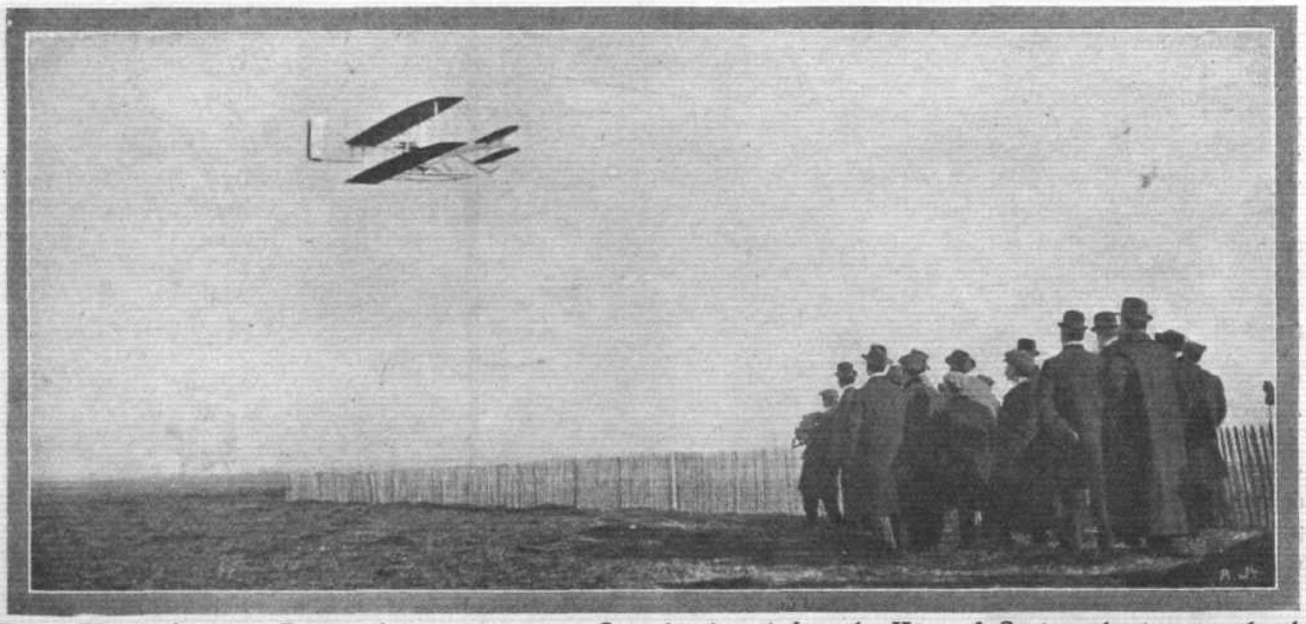
ACCORDING to Mr. H. Massac Buist, the Hon. C. S. Rolls will be the first Britisher to own a Wright aeroplane in England, he having, as an old friend of the Wrights, ordered his machine unconditionally last September.

Bleriot No. XI.

AT Issy, on Thursday of last week, February 18th, M. Bleriot succeeded in flying 700 metres with his short-span machine, "No. XI," and on a second attempt he again flew the same distance. Owing to the wind being a little gusty he did not, however, risk attempts at turning.

Bleriot Goes to Buc.

M. BLERIOT has now emigrated to the aerodrome at Buc, having come to the conclusion that Issy had become too small for him, as it has for most of the other aviators who have succeeded in getting over their



Wilbur Wright flying at Pau, with a passenger, on Saturday last, before the King of Spain, who is towards the front of the group watching the flight.

initial difficulties. It is at Buc that the experiments are carried out with the Pelterie monoplane, and it is on the same ground that M. Bleriot is continuing his trials, his machine being installed in a *hangar* close to that of the "R.E.P. 2 bis."

Alterations to "Bleriot No. XI."

M. BLERIOT does not seem to be altogether satisfied with the few short flights which he has made at Buc, and he is therefore thoroughly overhauling the machine. At the same time he will take the opportunity to slightly increase the lifting surface of the monoplane.

M. Santos Dumont succeeds Bleriot.

IMMEDIATELY M. Bleriot decided to transfer his monoplane to Buc, M. Santos Dumont offered to take over his *hangar* at Issy, and this offer was accepted. M. Dumont is having his little monoplane "Demoiselle" transferred there, and is arranging to commence experimenting in earnest with as little delay as possible.

Welferinger on the "Antoinette V."

PILOTING the Antoinette monoplane with which M. Demanest has been experimenting, M. Welferinger made two flights of 600 metres at an altitude of 3 metres over the Chalons ground on Friday, February 19th.

On Tuesday last M. Welferinger continued his success, and made a flight of over three kiloms.

Another Antoinette at Chalons.

"ANTOINETTE IV," the monoplane on which M. Welferinger made his first flights at Issy last year, has now been sent to Chalons, and will be used by Mr. Hubert Latham in his experiments until his own machine is ready for delivery.

Esnault-Pelterie and Santos-Dumont Enter for Monaco.

IT is reported that Esnault-Pelterie has entered one of his machines for the Monaco meeting and that Santos-Dumont is also likely to compete.

An up-to-date sign which Mr. C. A. Smith, of the White Lion Hotel, Cobham, has erected for his well-known and favourite Ripley road hostelry.

"Flight" Copyright Photo.

British Army Aeroplane.—Colonel Capper watching Mr. Cody's experiments with the Army machine on Thursday of last week.

A Tetrahedral Aeroplane.

DR. GRAHAM BELL is continuing his experiments at Nova-Scotia, whither he has removed his machines from New York, and last Monday he made the first trials with his tetrahedral apparatus. This contains 3,690 tetrahedral cells, and, including the aeronaut and the 50-h.p. motor, weighs 950 lbs. Unfortunately, very shortly after the machine had risen in the air, the propeller-shaft sheered and the propeller dropped off, but the machine glided slowly down without sustaining any serious damage. The trial was made over the frozen Bras d'Or lake at Baddeck, the aeroplane being mounted upon sledge runners. The machine is known as "Cygnet II," and the operator was Mr. Douglas McCurdy.

The "Silver Dart" Flies.

ON Wednesday Dr. Graham-Bell's biplane "Silver Dart," which we referred to some time ago, was tried over the frozen lake at Baddeck, and a flight of three-quarters of a mile in a straight line was successfully made.

The Breguet Aeroplane.

M. LOUIS BREGUET has decided to discontinue his experiments with his present machine, and is pushing forward the construction of a new aeroplane which will be fitted with a unique tractor screw. He is having a shed for it constructed close to the Brayelle aerodrome.

In the meantime M. Breguet is giving a free course of lectures on aviation at the Lille University.

Loch and Vivinus Aeroplanes.

AMONG the new sheds which are being put up at Chalons are those which will house the Loch and Vivinus aeroplanes.

Fresh Restrictions at Issy.

GENERAL FELDMANN, on behalf of the Military Authorities, has notified the Aero Club de France that from March 1st to November 1st aviators will only be allowed to experiment with their machines after 4.30 p.m. instead of 3 p.m.

Zipfel Leaves Berlin.

AFTER a mishap to the Voisin machine, M. Zipfel brought his trials at Berlin to a conclusion, and left for France last week.

The First Aerial "Way."

THERE has been a good deal of discussion in France about the question of properly marking out the country so that aviators may know where they are when in the air, and it now appears that a definite move is being made by the Aero Club du Centre, who are at work upon the route between Juvisy and Orleans. The terminus at the Orleans end will necessarily be about 3 kiloms. away from the town, as there are many dangerous obstacles in the way of closer approach. An aeroplane dock is contemplated on the aerodrome at Cercottes, where the landing will be effected. Suitable signs will be erected at such places as Arthenay and Angerville, but for the most part the route is an easy one to follow on account of the directness of the high road.

French National Aero Laboratory.

THE Aero Club of France has expressed the opinion that an aero laboratory should be founded and subsidised by the Government. A sum of 200,000 francs is spoken of in connection with the financial side of the scheme, and the Committee of the Aero Club have voted in principle a subsidy to help it to be carried through. Pressure is to be brought to bear in official quarters to bring the project to a head.

Zeppelin Taken Over by the German Army.

MAJOR SPURLING has been despatched to Friedrichshafen with a company of 80 men to take over the Zeppelin airship which has been purchased by the State. After a long series of trial trips, which will be carried out next month, the airship will be transferred to Metz.

"Parseval III."

WITH the exception of the Zeppelins, "Parseval III," which was placed in commission by the German Army last week, is their largest airship. The envelope is made of "Continental" balloon material, is 210 ft. long, 34 ft. in maximum diameter, and has a capacity of 5,600 cubic metres. The car is 22 ft. long, and carries two 100-h.p. engines. The headquarters of this airship are at Bitterfelde, and although in military commission, it is still actually the property of the semi-official Motor Airship Study Society.

Another Ligue Prize.

ONE of the latest Ligue Nationale thousand-franc prizes is that offered by Madame Charles Claudel and her sons, of Rouen. This will be awarded to the first aviator who, in any type of "heavier-than-air" machine, shall, starting from a point on the upper side of the Pont de Pierre at Rouen, fly down the river and *over* the Pont Transbordeur, then after having turned, return to the starting place, this time passing *under* the Pont Transbordeur, which has a height of 50 metres. The whole manœuvre must be carried out without the machine touching earth.

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AVIATION IN PARLIAMENT.

REPLYING to Mr. Fell, Mr. Haldane, in Parliament last week, said that the future policy, as regarded aeroplanes and dirigible balloons, was now receiving very careful consideration, and accordingly at the present moment he was not in a position to give information on the subject.

Mr. Fell: "Does the right hon. gentleman consider that the results up to the present time have been satisfactory?"

Mr. Haldane: "All that had better be answered when I go into the whole subject."

In answer to a further question, Mr. McKenna said that the use of dirigible balloons for work in connection with the fleet was being considered.

On Tuesday, in replying to Mr. Macpherson, who asked how much public money had been spent up to the present by the War Office on experiments with aeroplanes and dirigibles, Mr. Haldane said the amount was about £19,000. Mr. A. Lee then asked if any steps had been taken by way of expenditure to acquire the services of the Wright Brothers, but Mr. Haldane said he would rather not answer that question at present.

Mr. Guffroy's R.E.P. monoplane after its accident last week. When turning, during a flight of 800 metres at a speed of 80 kiloms. per hour, one of the wings struck the bank seen in the photograph, causing the machine to capsize and crash to earth in the position seen above. Only the propeller was damaged, and Mr. Guffroy escaped unhurt.

Flight

THE PRESENT STATUS OF MILITARY AERONAUTICS.*

By GEORGE O. SQUIER, Ph.D., Major, Signal Corps, U.S. Army.

It is a matter of first significance that the American Society of Mechanical Engineers, composed of a body of highly trained and serious-minded men, should be considering in annual meeting assembled the subject of aerial navigation. Five years ago such a subject could scarcely have had a place on the list of professional papers on your programme. The present period will ever be memorable in the history of the world for the first public demonstrations of the practicability of mechanical flight. In fact, at the present moment a resistless wave of enthusiasm and endeavour, sweeping away every prejudice, is passing over the entire civilised world, fixing the attention of all classes upon the probability of flight. France, Germany, and England are in a state of frenzied interest in this subject, and each period of a single month sees some new step accomplished in the march of progress. The universal highway is at last to be made available for the uses of mankind, with its consequent influence upon our modes of life and thought.

The subject of war balloons and their accessories pertains by law to the Signal Corps of the Army, and some months since an invitation was extended to the chief signal officer of the Army, Gen. Allen, to meet with you on this occasion, and present to this distinguished body of practical engineers an outline of the work of the Government in this direction. On account of pressure of official duties, General Allen has designated me to perform this duty, and notwithstanding a keen consciousness of personal shortcomings, yet I would be indeed lacking in sentiment if I failed to acknowledge the honour felt in appearing here to-day to present such a subject for the first time before a national body of American engineers.

At the outset, it must be stated that the subject is so vast in its scientific details, and that data and results are being obtained so rapidly, that it is manifestly impossible to present more than the merest outline of the present state of this new science and art within the limits of a short paper. From the earliest times men have dreamed of imitating the birds in sailing through the air, yet it is only within a very few years that the strength of materials and the mechanical construction of motors have reached a state to make power-flight possible. The industrial development of the automobile has been a powerful ally in the realisation of mechanical flight, and the engineering profession finds itself equipped and ready to further the development of this great problem.

On December 23rd, 1907, the Signal Corps of the Army issued a public advertisement and specification, calling for bids for furnishing the Government with a heavier-than-air flying machine. (A copy of this specification will be appended to this Paper as of possible historical interest.)

The conditions of this specification require that the Government be furnished with a heavier-than-air flying machine capable of carrying one passenger besides the aviator, and it must remain in the air on endurance test for a period of one hour without landing, and must also be subjected to a speed test, over a measured course, of more than 5 miles, against and with the wind, attaining a minimum speed of 36 miles per hour. The machine must, in addition, carry fuel for a continuous flight of not less than 125 miles.

In preparing this specification, it was purposely sought to leave the bidder perfectly free in the methods to be employed, and he was not restricted as to type or design. At the time this specification was issued eleven months ago,† the conditions were publicly regarded as being unusually severe, and far beyond the state of the art at that time. That these conditions were justified has been subsequently proved, as is now well known.

Although the public advertisement called for but one heavier-than-air machine, yet when the bids were opened it was found possible through the co-operation of the Board of Ordnance and Fortification, to award contracts to each bidder who complied with the requirements of the law in every respect, and consequently contracts were ultimately awarded to the Wright Brothers, of Dayton, Ohio, for the sum of $25,000 for a 40-mile speed, and also to A. M. Herring, of New York, for the sum of $20,000.

It was believed that the acceptance by the Government of each of the bids submitted instead of but one of them would serve as an additional stimulus to develop practical aviation in the United States, and at the same time serve to supply the War Department with machines needed in military service. This dual object—to advance a new art of interest to the nation as a whole, and to secure necessary equipment for the military establishment—has been in the past and is at present the policy of the Signal Corps of the Army.

* Presented at the New York meeting (December, 1908), of the American Society of Mechanical Engineers.

† Published in *The Automotor Journal* of January 18th, 1908.

The result of issuing this specification, as well as a similar one for supplying a small dirigible balloon for the preliminary training of the men of the Signal Corps, was an awakening of interest in this subject throughout the country to such an extent that the Signal Office continues to receive daily a large number of letters, plans, and models proposing manifold schemes for navigating the air.

The Aeronautical Division of the Office of the Chief Signal Officer of the Army was organised on July 1st, 1907, and the Aeronautical Board of the Signal Corps was appointed in July of the current year for conducting tests of dirigible balloons and aeroplanes under existing contracts.

It should be stated that the mention of particular types of dirigible balloons and aeroplanes in this paper must not be considered as an official endorsement of these particular machines, nor the failure to mention other types be construed to indicate a lack of equal recognition of the merits of the latter. In the case of the Wright Brothers, however, it is desired to associate the Signal Corps of the Army publicly and officially with the present universal recognition of their work in advancing the science and art of aviation. These results have been due to the persistence, daring, and intelligence of these American gentlemen, to whom the whole world is now paying homage. It will ever be recorded that the classic series of public demonstrations first made by Orville Wright at the Government testing grounds at Fort Meyer, Va., in September, 1908, and by Wilbur Wright at Le Mans, France, made a profound impression throughout the world, and kindled especially the patriotic spirit of the American people.

There are two general classes of vehicles in the air: (*a*) those which depend for their support upon the buoyancy of some gas lighter than air, and (*b*) those which depend for such support upon the dynamic reaction of the air itself. These classes are designated:—

(*a*) *Lighter-than-air types*:—Free balloons, dirigible balloons or airships.

(*b*) *Heavier-than-air types*:—Aeroplanes, orthopters, helicopters, &c.

It should be remarked, however, that these two general classes exhibit a growing tendency to overlap each other. For example, the latest dirigible balloons are partly operated by means of aeroplane surfaces, and are also often balanced so as to be slightly heavier than the air in which they move, employing the propeller thrust and rudder surfaces to control the altitude.

I. AEROSTATION.

Captive and free balloons, with the necessary apparatus and devices for operating the same, have been for many years considered an essential part of the military establishment of every first-class Power. They played a conspicuous part in the siege of Paris, and were often valuable in our own Civil War. The construction and operation of aerostats are too well understood to need further attention here.

Successful Military Dirigible Balloons.

FRANCE.

Two types of dirigible balloons have been used in the French Army; first the "Patrie," and second the "Ville de Paris."

The "Patrie" was developed by Julliot, an engineer employed by the Lebaudy Brothers at their sugar refinery in Paris. A history of his work beginning in 1896 is fully given in *La Conquête de l'Air*.

The "Patrie" (Figs. 1 and 2).

The "Patrie," the third of its type, was first operated in 1906. The gas-bag of the first balloon was built by Surcouf at Billancourt, Paris. The mechanical part was built at the Lebaudy Sugar Refinery. Since then the gas-bags have been built at the Lebaudy balloon shed at Moisson, near Paris, under the direction of their aeronaut, Juchmés. The gas-bag of the "Patrie" was 197 ft. long with a maximum diameter of 33 ft. 9 ins., situated about two-fifths of the length from the front; volume 111,250 cub. ft.; length approximately six diameters. This relation, together with the cigar shape, is in accordance with the plans of Colonel Renard's dirigible, built and operated in France in 1884; the same general shape and proportions being found in the "Ville de Paris."

The first Lebaudy was pointed at the rear, which is generally admitted to be the proper shape for the least resistance, but to maintain stability it was found necessary to put a horizontal and

vertical plane there, so that it had to be made an ellipsoid of revolution to give attachment for these planes.

The ballonette for air had a capacity of 22,958 cub. ft. or about one-fifth of the total volume. This is calculated to permit reaching a height of about 1 mile and to be able to return to the earth, keeping the gas-bag always rigid. To descend from a height of 1 mile, gas would be released by the valve, then air pumped into the ballonette to keep the gas-bag rigid, these two operations being carried on alternately. On reaching the ground from the height of 1 mile, the air would be at the middle of the lower part of the gas-bag and would not entirely fill the ballonette. To prevent the air from rolling from one end to the other when the airship pitches, thus producing instability, the ballonette was divided into three compartments by impermeable cloth partitions. Numerous small holes were pierced in these partitions through which the air finally reached the two end compartments.

In September, 1907, the "Patrie" was enlarged by 17,660 cub. ft. by the addition of a cylindrical section at the maximum diameter, increasing the length but not the maximum diameter.

The *gas-bag* is cut in panels; the material is a rubber cloth made by the Continental Tyre Co. at Hanover, Germany. It consists of four layers arranged as follows:—

	Weight.
(*a*) Outer layer of cotton cloth covered with lead chromate	2·2 oz. per sq. yd.
(*b*) Layer of vulcanized rubber	2·5 ,, ,,
(*c*) Layer of cotton cloth	2·5 ,, ,,
(*d*) Inner layer of vulcanized rubber ...	2·21 ,, ,,
Total weight	9·71 ,, ,,

A strip of this cloth 1 ft. wide tears at a tension of about 934 lb. A pressure of about 1 in. of water can be maintained in the gas-bag without danger. The lead chromate on the outside is to prevent the entrance of the actinic rays of the sun which would cause the rubber to deteriorate. The heavy layer of rubber is to prevent the leaking of the gas. The inner layer of rubber is merely to prevent deterioration of the cloth by impurities in the gas. This material has the warp of the two layers of cotton cloth running in the same direction and is called straight thread. The material in the ballonette weighs only about 7¾ ozs. per sq. yd., and has a strength of about 336 lbs. per running foot. When the "Patrie" was enlarged in September, 1907, the specifications for the material allowed a maximum weight of 10 ozs. per sq. yd., a minimum strength of 907 lbs. per running foot, and a loss of 5·1 cub. ins. of hydrogen per sq. yd. in 24 hours at a pressure of 1·18 ins. of water. Bands of cloth are passed over the seams inside and out with a solution of rubber to prevent leaking through the stitches.

Suspension.—One of the characteristics of the "Patrie" is the "short" suspension. The weight of the car is distributed over only about 70 ft. of the length of the gas-bag. To do this, an elliptical-shaped frame of nickel-steel tubes is attached to the bottom of the gas-bag; steel cables run from this down to the car. A small hemp net is attached to the gas-bag by means of short wooden cross pieces or toggles which are let into holes in a strong canvas band which is sewed directly on the gas-bag. The metal frame, or platform, is attached to this net by means of toggles, so that it can be quickly removed in dismounting the airship for transportation. The frame can also be taken apart. Twenty-eight steel cables about 0·2 in. in diameter run from the frame down to the car, and are arranged in triangles. Due to the impossibility of deforming a triangle, rigidity is maintained between the car and gas-bag.

The objection to the "short" suspension of the "Patrie" is the deformation of the gas-bag. A distinct curve can be seen in the middle.

The Car.—The car is made of nickel-steel tubes (12 per cent. nickel). This metal gives the greatest strength for minimum weight. The car is boat-shaped, about 16 ft. long, about 5 ft. wide, and 2½ ft. high. About 11 ft. separate the car from the gas-bag. To prevent any chance of the fire from the engine communicating with the hydrogen, the steel framework under the gas-bag is covered with a non-combustible material.

The pilot stands at the front of the car, the engine is in the middle, the engineer at the rear. Provision is made for mounting a telephotographic apparatus, and for a 100-candle-power acetylene search-light. A strong pyramidal structure of steel is built under the car, pointing downward. In landing the point comes to the ground first, and this protects the car, and especially the propellers, from being damaged. The car is covered to reduce air resistance. It is so low, however, that part of the equipment, and most of the bodies of those inside, are exposed, so that the total resistance of the car is large.

The Motor.—The first Lebaudy had a 40-h.p. Daimler-Mercedes benzine motor. The "Patrie" was driven by a 60-h.p. to 70-h.p. 4-cyl. Panhard and Levassor benzine motor, making 1,000 r.p.m.

The Propellers.—There are two steel propellers 8½ ft. in diameter (two blades each) placed at each side of the engine, thus giving the shortest and most economical transmission. To avoid any tendency to twist the car, the propellers turn in opposite directions. They are "high speed" making 1,000 to 1,200 r.p.m.

The gasolene tank is placed under the car inside the pyramidal frame. The gasoline is forced up to the motor by air compression. The exhaust is under the rear of the car pointing down, and is covered with a metal gauze to prevent flames coming out. The fan which drives the air into the ballonette is run by the motor, but a dynamo is also provided so that the fan can always be kept running even if the motor stops. This is very essential, as the pressure must be maintained inside the gas bag so that the latter will remain rigid and keep its form. There are five valves in all, part automatic and part both automatic, and also controlled from the car with cords. The valves in the ballonette open automatically at less pressure than the gas-vessel, so that when the gas expands all the air is driven out of the ballonette before there is any loss of gas. The ballonette-valves open at a pressure of about 0·78 in. of water, the gas-valves at about 2 ins.

Stability.—Vertical stability is maintained by means of fixed horizontal planes. One having a surface of 150 sq. ft. is attached at the rear of the gas-bag, and due to its distance from the centre of gravity is very efficient. The elliptical frame attached under the gas-bag has an area of 1,055 sq. ft., but to its proximity to the centre of gravity has little effect on the stability. Just behind the elliptical-frame is an arrangement similar to the feathering on an arrow. It consists of a horizontal plane of 150 sq. ft., and a vertical plane of 113 sq. ft. To maintain horizontal stability, that is, to enable the airship to move forward in a straight line without veering to the sides, fixed vertical planes are used. One runs from the centre to the rear of the elliptical-frame, and has an area of 108 sq. ft.

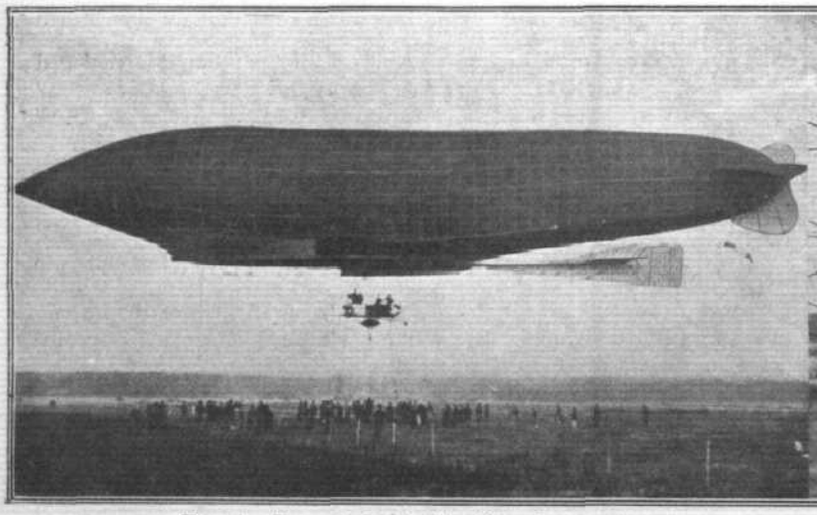

Fig. 1.—French Dirigible "La Patrie."

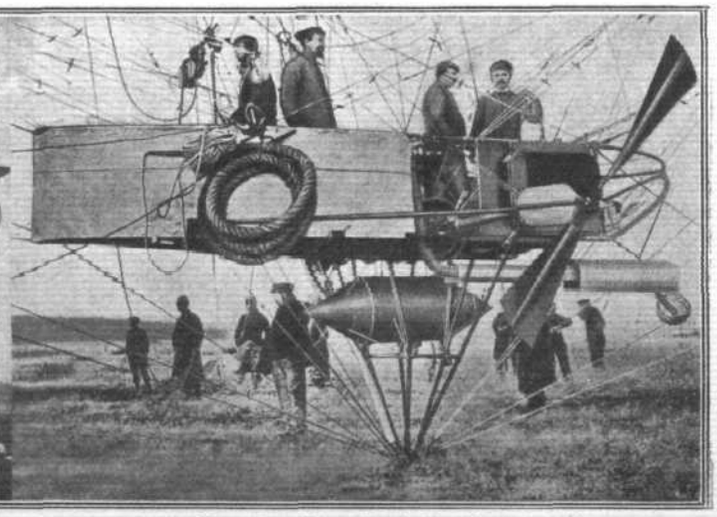

Fig. 2.—Details of the Car.

In addition to the vertical surface of 113 sq. ft. at the rear of the elliptical-frame, there is a fixed frame of 150 sq. ft. at the rear of the gas-bag. To fasten the two perpendicular planes at the rear of the gas-bag, cloth flaps are sewed directly on the gas-bag. Nickel steel tubes are placed in the flaps, which are then laced over the tubes. With these tubes as a base, a light tube and wire framework is attached, and waterproof cloth laced on this framework. Additional braces run from one surface to the other, and from each surface to the gas-bag. The rudder is at the rear under the gas-bag. It has about 150 sq. ft., and is balanced.

A movable horizontal plane near the centre of gravity, above the car, is used to produce rising or descending motion, or to prevent an involuntary rising or falling of the airship due to expansion or contraction of the gas, or to other causes. After the adoption of this movable horizontal plane, the loss of gas and ballast was reduced to a minimum. Ballast is carried in 10 lb. and 20 lb. sand-bags. A pipe runs through the bottom of the car, from which the ballast is thrown.

There are two long guide ropes, one attached to the front of the elliptical-frame and the other on the car. On landing, the one in front is seized first so as to hold the airship with the head to the wind. The motor may then be stopped, and the descent made by pulling down on both guide ropes. A heavy rope, 22 ft. long, weighing 110 lbs., is attached on the end of a 164 ft. guide rope. This can be dropped out on landing to prevent coming to the ground too rapidly. The equipment of the car includes a "siren" speaking trumpet, carrier pigeons, iron pins, and a rope for anchoring the airship, reserve supply of fuel and water, and fire extinguisher.

After being enlarged in September, 1907, the "Patrie" made a number of long trips at an altitude of 2,500 to 3,000 ft. In November, 1907, she went from Paris to Verdun, near the German frontier, a distance of about 175 miles, in about seven hours, carrying four persons. This trip was made in a light wind blowing from the north-east. Her course was east, so that the wind was unfavourable. On Friday, November 29th, 1907, during a flight near Verdun, the motor stopped, due to difficulty with the carburettor. The airship drifted with the wind to a village about 10 miles away, where she was safely landed. The carburettor was repaired on the 30th. Soon after, a strong wind came up, and tore loose some of the iron pickets with which it was anchored. This allowed the airship to swing broadside to the wind; it then tilted over on the side far enough to let some of the ballast bags fall out. The 150 or 200 soldiers who were holding the ropes were pulled along the ground until directed by the officer in charge to let go. After being released, it rose, and was carried by the wind across the north of France, the English Channel, and into the north of Ireland. It struck the earth there, breaking off one of the propellers, and then drifted out to sea.

(To be continued.)

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AERO CLUB OF THE UNITED KINGDOM.

OFFICIAL NOTICES TO MEMBERS.

Annual General Meeting.

The Annual General Meeting of the members of the Aero Club of the United Kingdom will be held at 166, Piccadilly, London, W., on Thursday, March 11th, 1909, at 5 o'clock.

Members are reminded that a ballot paper, for the election of nine candidates to serve on the Committee of the Club for the ensuing year, will be forwarded to them at least seven days before the date of the Annual General Meeting.

The following members have so far been nominated, and have signified their willingness to serve:—

*Griffith Brewer.	Frank McClean.
*Frank H. Butler.	C. A. Moreing.
Major C. de W. Crookshank.	*C. F. Pollock.
*John Dunville.	*J. Lyons Sampson.
*Capt. A. H. W. Grubb.	*Stanley Spooner.
*Prof. A. K. Huntington.	G. Holt Thomas.
Dr. J. W. S. Lockyer.	

The names of the retiring members of the Committee are indicated by an asterisk.

Gordon-Bennett Aviation Cup.

The Aero Club of the United Kingdom have sent in three entries for the Gordon-Bennett Aviation Cup, which will be competed for at Rheims on August 29th, 1909.

The competition is for an International Challenge Cup of the value of £500, to be competed for by clubs belonging to the Federation Aeronautique Internationale. In addition, a sum of £1,000 will be awarded to the winner. Other prizes will be competed for during the Aviation Week at Rheims and full particulars will be announced later.

Pau Flying Ground.

The Mayor of Pau will grant members of the Aero Club of the United Kingdom free use of the new Champ d'Aviation, which gives a three-mile straight flight and a turning place at each end. Members wishing to avail themselves of this offer are requested to communicate with the Secretary of the Aero Club.

Lecture at the Royal United Service Institution.

A lecture on the "Defence of Harbours against Airships," by Col. F. G. Stone, R.A., will take place at the Royal United Service Institution, Whitehall, S.W., on Wednesday, March 10th, 1909, at 3 p.m. A few admission tickets have been kindly placed at the disposal of the Aero Club, and members wishing to attend should communicate with the Secretary.

New Members.

The following new members have been elected:—

G. B. Cockburn.	Capt. Martin.
Capt. V. Champion de Crespigny.	Douglas Pigot.
Andrew Fletcher.	Sir R. Waldie-Griffith, Bart.

Balloon Photographs.

A Bronze Medal will be awarded for the best set of photographs taken by a member from a balloon during the year 1908. Members are requested to forward the photographs to the Secretary by March 31st, 1909.

Aero Exhibition at Olympia.

The Aero Exhibition at Olympia, held by the Society of Motor Manufacturers under the auspices of the Aero Club of the United Kingdom, will take place in March, opening on the 19th and terminating on the 27th. Members of the Aero Club will be admitted free on production of their Aero Club membership cards. A room will be placed at the disposal of the members during the Exhibition.

Free space will be granted to non-trade members of the Aero Club and the Aero Club League for exhibiting their machines, and applications should be made as early as possible to the Secretary of the Aero Club, 166, Piccadilly, London, W.

Model Flying Machines at Olympia.

Owing to the large number of model flying machines which have been entered for the Aero Exhibition at Olympia, the Committee of the Aero Club have decided to close the entries on Tuesday, March 2nd, 1909.

Those desirous of exhibiting are requested to communicate with the Secretary of the Aero Club. Free space will be given to exhibitors.

HAROLD E. PERRIN,
Secretary.

The Aero Club of the United Kingdom,
166, Piccadilly, W.

FRENCH COMPETITION RULES OF THE C.A.M.

THE Commission Aerienne Mixte have just published in book form their official rules relating to competitions and trials in that sphere of aeronautics over which they exercise jurisdiction in France, and we publish below a translation of the more important section which relates to the actual organisation of these events. The general rules and regulations are of less widespread interest, inasmuch as they mainly refer to such matters as that programmes of competitions must expressly mention the recognition by the organisers of the rules of the C.A.M. and F.A.I., that competitors must not employ pseudonyms without permission, that adherents to the F.A.I. have a right of appeal to that body, that the C.A.M. decide the eligibility of competitors, and like matters, so far as they concern events taking place in France.

There are four recognised classes in which machines can take part in official trials; each class has its own set of special rules and the classes are as follows:—Class A, dirigibles; Class B, motor-driven flying machines; Class C, flying machines without a motor; Class D, kites and unmounted machines.

The following are the special rules relating to each class:—

CLASS A.—Dirigibles.

1. **Competitions.**—Dirigibles belonging to Class A will be considered as those machines which do not rely exclusively upon mechanical means for their support, and in the *ensemble* of which any gas whatever is used, either temporarily or permanently, for the purposes of support.

2. Distances will be measured:—
Up to 5 kiloms. by such means as the officials consider proper.
From 5 to 50 kiloms. on an Ordnance Map scale $\frac{1}{80000}$.
Over 50 kiloms. on a globe at sea-level.

3. **Speed Trials.**—Speed trials consist of making the greatest possible velocity in respect to still air. This real speed may be measured directly or indirectly. Manœuvring at the start and finish is not included.

4. The direct measurements of real speed must be made by methods and instruments certified by the C.A.M. Self-recording instruments must be submitted with unbroken seals, and instruments which need operation by hand must be in charge of an official on board.

5. Indirect measurements of real speed will not take into account observations of the state of the wind, but will be deduced from a sufficient number of observations of the absolute speed. To this end, the trials may be made with and against the wind, across the wind, and over a closed circuit, in particular a square. A programme must be drawn up indicating the site for operations, and must specify the disposition and distance apart of the mark-posts which determine the course.

6. In speed trials classification by absolute speed is permitted, and awards may be allotted on this classification, but the deduced speed in relation to still air must be the basis of any special awards.

7. Trials of absolute speed must always take place over a closed circuit.

8. In such trials the following classes are recognised:—
(1.) Limited cubic capacity with unlimited engine power.
(2.) Limited engine power with unlimited cubic capacity.
(3.) Limited power and capacity.

9. Descents with and without replenishment are authorised, but replenishments may only take place at points fixed in advance.

10. **Records.**—No record will be registered other than those recognised by the C.A.M.

11. Applications for registration of records must be accompanied by all the calculations.

12. Records established in connection with competitions must be *viséed* by an official at the trial when sent in for registration. Records established apart from a competition must be accompanied by authentic certificates relating to the event.

13. Records recognised at the present time are as follows:—
(1.) Real speed (in respect to still air).
(2.) Absolute speed from point to point.
(3.) Absolute speed for a return journey.
(4.) Absolute speed over an open polygon.
(5.) Absolute speed over a closed circuit.
(6.) Distances run to a certain destination (with or without descent).
(7.) Distance run over a return journey (with or without descent).
(8.) Distance run over an open polygon (with or without descent).
(9.) Distance run on a closed circuit (with or without descent).
(10.) Duration of journey.
(11.) Altitude.

14. Time occupied in descents will be included in the record.

CLASS B.—Motor-Driven Flying-Machines.

1. Competitors must personally insure the attendance of one or more officials, chosen from a list approved by the C.A.M., at any trial which they undertake. The oldest official present is responsible for the organisation of the trial and for the choice of the attendants necessary for its control. He can be assisted by officials chosen among members of societies affiliated to one or other of the four associations represented on the C.A.M.

2. When necessary, the C.A.M. may delegate its authority in connection with a trial to a society which is affiliated to one or other of the four associations represented by the C.A.M.

3. Entries will not be accepted unless the entrant gives sufficient evidence of previous satisfactory performances.

4. The C.A.M. or its representative must agree as to the trial ground and general rules in all cases.

5. The responsible official has authority on the trial ground within the limits of the rules in force. He has always the right to refuse to hold a trial, or to stop one already in progress.

6. In competitions and records which partly take place out of sight of the officials, competitors must provide control devices, which must be certified by an official. The C.A.M. reserves the right to specify the type of these devices, or to pass those submitted by the competitors. Should such devices not work properly, the official can cancel part or all of the trial.

7. Courses must be marked out as follows:—Circuits which have to be covered a certain number of times must be of polygon form and without re-entrant angles. The angles of the circuit must be indicated by posts or ballonettes. Competitors must pass outside the marks and leave them always on the same hand. Should a competitor foul a mark, he can continue only on the condition that he first circles the mark which he has fouled. Courses which are not closed must be marked at the beginning and end by a couple of posts or ballonettes, between which the competitor must pass. Should the competitor foul the marks he may only continue on the condition that he first circles them.

8. Closed circuits will have an official length equal to the sum of the sides as represented by straight lines joining the posts in sequence. Open courses will have an official length equal to the straight line distance between the start and finish.

9. Distances up to 5 kiloms. may be measured by the officials in such manner as seems to them best. From 5 to 50 kiloms. the distances must be measured on an ordnance map having a scale of $\frac{1}{80000}$. Distances above 50 kiloms. will be measured on a globe at sea-level.

10. A report of the trial must mention all important incidents connected therewith, and specify the conditions under which it was carried out; it must be accompanied by a plan of the course, and a table of times, distances, names of witnesses, and details of breaches of rules, if any. A report must be sent to the C.A.M. immediately after the trial.

11. Competitors must give 24 hours' notice of their intention to make a trial, and must send the entrance fee, if any, at the same time. The entrant must specify the day and hour for the trial; also the names of the officials whom he has personally enlisted in his service.

CLASS C.—Flying Machines Without a Motor.

1. These rules apply to machines designed to effect glides without engines. The machines may be mounted or unmounted, and the trials in each case will be considered separately.

2. Mounted gliders can only be admitted for trial on sufficient evidence of previous satisfactory experiments.

3. In each specific class of trial a distinction will be made between records and competitions.

4. The three following trials are admitted for records:—
(1.) Glides of gradual descent.
(2.) Trials of sustaining power.
(3.) Trials of load-weight ratio.

5. Glides of gradual descent must be effected at a maximum angle to the horizontal of 40°. Records will be established

according to the following formula: $\alpha = \frac{H}{E + E'}$, where E is the horizontal distance between two points of observation, E′ is the distance traversed by the wind during the period, and H is the fall of the machine during the period. The period must be timed by officials, and the wind measured at an altitude of 10 metres at least above the top of the hill used for starting.

6. The sustaining power, Q, of a glider will be considered as the ratio $\frac{\lambda}{\lambda'}$ of the weight λ per sq. metre to the weight λ' of a parachute falling vertically with the same vertical speed, v. The weight per sq. metre will be considered as the total weight, P, of the machine in respect to its total surface, S. The rate of fall, v, is represented by the vertical distance divided by the time of a given period. The load of a parachute for comparison is given by the formula $\lambda' = 0{\cdot}085\ v^2$ where v is the rate of fall (the constant 0·085 is considered as representing the mean coefficient of air resistance). The sustaining power, Q, thus obtained will be the basis of awards and records under this heading. It is not necessary in this trial to measure the speed of the wind.

7. The load-weight rates will be considered as the ratio, $P'/P'' = l$, of the useful load, P′, carried to the weight, P″, of the machine itself. This ratio will serve as a basis of awards and records under this heading.

8. The mean of three trials will be used as a basis for awards and records in tests carried out according to Articles 4, 5, and 6.

9. The all-round efficiency, G, of the machine will be represented by the marks C, C′, and C″, collected according to the following formula $G = C + C' + \frac{1}{2}C''$. The values of C, C′ and C″ will be determined as follows:—

(1.) Glides of gradual descent. $C = \frac{1}{\alpha}$ which gives a maximum of 20 for $\alpha = \frac{1}{20}$.

(2.) Sustaining power. $C' = \frac{Q}{5}$ which gives a maximum of 20 for Q = 100.

(3.) Load/weight ratio. $C'' = 4\,l$, which gives a maximum of 20 for $l = 5$.

10. Records for registration must specify the results under each heading. The general marking will not count for the registration of records.

11. Trials carried out under any of the above headings, but according to simplified methods, will not hold as records.

12. Competitions of (1) distance, (2) duration, (3) load/weight ratio, and (4) all round merit, will be recognised.

13. Trials of distance must be carried out like those of gradual descent, except that the distance will be reckoned from a point defined by the officials, which must be crossed in full flight, to the spot where the machine first touches the ground.

14. Trials of duration will be carried out like those for sustaining power; the fall will be reckoned as being merely the distance of descent in a given period of time.

15. Competitions of the third and fourth classes in Article 12 will be carried out as indicated in Articles 7 and 8.

CLASS D.—Kites.

Unmounted Machines: Trials of Merit.—1. Competitors may submit machines of any kind and size. The kites will be raised simultaneously by means provided by the competitors, and each with a cord having a length fixed by the officials between 200 and 400 metres. The cords may be of any size or kind.

2. Competitors must provide some form of instrument capable of registering continuously the pull of the kite on the cord. The officials have the right to demand that such instruments shall be tested in their presence. Competitors must submit to the use of other competitors' instruments for testing their kites, and *vice versâ*.

3. Trials must last at least 1 hour, and if the machine falls to the ground before that time has elapsed it will be disqualified.

4. The officials will measure (1) the surface, (2) weight, (3) angle of inclination of the cord, (4) pull on the cord. Measurements of the angle and pull will be made simultaneously, if possible, for all devices in the competition.

5. The jury will take note of the stability of the kites.

6. In eliminating trials an angle of inclination of less than 45° to the horizontal will disqualify.

7. Classification will be made in the following manner:—1 mark for the ratio, vertical lift per square metre of surface; 1 mark for the value of the sign of the angle of the inclination of the cord to the horizontal; 2 marks for stability.

8. **Altitude.**—Competitors may enter devices of any kind and size.

9. Each device must be fitted with an altitude recorder, and the various machines will be sent up simultaneously by the competitors, who must provide the apparatus and cord necessary. No special conditions are imposed as to the nature of this apparatus.

10. Awards will be made in accordance with the order in which the devices reach the highest altitude, and without consideration for the time during which they remain there.

11. **Mounted Kites.**—A mounted kite or train of kites must be capable of lifting a basket of sufficient capacity to carry an aeronaut, and at least 70 kilogs. of ballast. Competitors mount their kites at their own risk.

12. **Trials of Merit and Stability.**—Mounted kites will be tested on the same lines as unmounted kites, but the angle of inclination will be considered as that represented by a line carried to the centre of the basket from the anchorage of the cord.

13. **Altitude.**—Mounted machines will be tested for altitude on the same lines as unmounted machines, but the recording instrument must be in the basket with the aeronaut.

14. **Gliding Trials.**—Trials of altitude may be combined with trials of gliding by cutting the cables while the kite is in the air. Awards will be made for the slowest descents.

15. **Records.**—Records of altitude for mounted and unmounted machines are recognised.

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CORRESPONDENCE.

*** *The name and address of the writer (not necessarily for publication)* MUST *in all cases accompany letters intended for insertion, or containing queries.*

AERONAUTICAL TERMINOLOGY.

To the Editor of FLIGHT.

SIR,—I am pleased to note an effort is being made to systematically arrange our future aeronautical language. I thoroughly endorse the views set forth in your correspondence columns of current issue in a large measure. Although unable, due to distance from the metropolis, to join the various associations therein, I presume comment from an outsider's point of view is permitted.

As regards the misuse of the word "aeroplane," there can be no question. It is to be hoped you will endeavour, as the pioneer, and therefore the most immediately influential periodical, to do as suggested, "relegate this to its obviously proper place." The hint is given that criticism on this subject should be brief, hence I will try to be so. "Length" is as much a misnomer as "aeroplane." How would the combination "fore-aft" measurement meet the case? Your "spread or span" is better than your correspondent's "transverse," "bi-flier," "tri-flier, &c., and would quickly, if adopted by you, become universal. It may appear somewhat drastic to attempt substitution of another word for "aeroplane" as now used, but as the science is only in its initial stage it should be a comparatively easy matter.

What is the "hash" of terms by the International Aero Commission? I have not heard of this society before, and have not access to the Aeronautical Journal.

I entirely disagree with Mr. Alderson that a glossary could be arranged at one sitting. On the contrary, it should be most carefully considered and discussed before final acceptance.

Yours truly,

Carlisle. J. G. MOFFETT.

To the Editor of FLIGHT.

SIR,—I have read with interest the comments on aeronautical nomenclature, and hope, as proposed in the correspondence column, that the term "aeroplane" will now be discontinued as an expression to denote a "flying machine." It is noteworthy that in the recent smart article by Mr. Wilbur Wright in the *London Magazine*, that most practical exponent of aerial navigation uses throughout the word "flyer" when referring to the machine. There surely could be no valid objection to the appropriation in scientific periodicals such as yours, of Mr. Wright's definition, instead of the present objectionable term. "Curvane" and "aerofoil" are quite suitable words, both having been used in recent years. "Wing," as expressing a part of a machine, is not good; it ought to be left, in my opinion, to represent its original meaning. Surely the numerous inventors who read your comprehensive weekly paper will be able to suggest many suitable expressions from which you could select the best forms. Therefore, there is no necessity for further criticism in this letter.

Yours faithfully,

Hornsey. KENROY.

PROPELLERS AND MOTORS.

To the Editor of FLIGHT.

SIR,—*Re* Mr. Hollands' letter in FLIGHT, February 20th.

In the first place, I beg to say that I was ignorant of the existence of a Hollands' propeller until FLIGHT came into existence, and I have never had the pleasure of reading the testimonials mentioned.

It appears to me that Mr. Hollands is "word-twisting" and avoiding the main issue by trying to impress your readers that the meaning of my letter is entirely opposite to that expressed.

If Mr. Hollands is *certain* that he has a propeller of great efficiency, then he must have an aeroplane or aeroplanes on which he has been flying "on the quiet," to have been in a position to obtain the data for the designing of such a propeller, as it is impossible, in my humble opinion, to have obtained the data without actual experience with large aeroplanes in free flight. I am sure your readers will be delighted to hear of such flights, if only for the satisfaction of knowing that another Englishman has "come to the top." I, for one, have not yet heard of any aeroplane at present flying fitted with a "Hollands," and should be glad to hear that a machine is fitted with one. It would appear that "Frenchmen" are not the only "conservative" people in the world; there appear to be many such.

Either Mr. Hollands is perversely dense or my writing is unintelligible, and I will slightly alter my query in FLIGHT of February 13th.

What is the difference in the mechanical efficiency of a "Hollands" and a "Voisin" *both* on an aeroplane?

To obtain this data correctly, it is necessary to fit an aeroplane with one propeller, obtain a flight with recording instruments in use, and then test it fitted with the other propeller in the same way.

How is it that the "king of flyers" has "knocked creation" with a mechanically-crude wooden propeller made by himself? I think this alone proves the point in my letters, viz., that it is absolutely necessary to have experience in flight before one *knows* the *particular* propeller for a *particular* machine, and the *slightest* alteration in a machine requires an alteration in the propeller to again reach the point of *highest efficiency*, although the machine is still the same size, assuming that the efficiency was a maximum in the first case.

I am afraid I shall never agree with Mr. Hollands until he leaves *ironical* generalities and *levity*, and gives some exact data, in which case I shall be pleased to "climb down" and say, "Well done, *Englishman!*" from a patriotic point of view, and with the same feeling as I view the performances of Mr. Moore-Brabazon on his "Voisin."

Yours very truly,

MONTFORD KAY.

THE TREVOR SCHOOL.

To the Editor of FLIGHT.

SIR,—We are pleased to inform you that on Monday next we actually commence tuition in aeroplanes. Our "flying department" will be inaugurated on March 1st.

In view of the rather contradictory reports that have been published concerning our schools, may we be permitted to point out that we are not at present proposing to teach the theory of construction. We are limiting ourselves to training the practical flyer, and not the builder.

The aeroplane which we have ordered is an all-British machine, which we expect will be ready in about ten or twelve weeks. We have not yet decided upon the flying ground, but full particulars as to this we shall be in a position to publish later.

In the meantime, you will be glad to hear that we have secured the services of Mr. T. W. K. Clarke, B.A., A.M.I.C.E., who will be the general instructor in the flying department.

Yours faithfully,

TREVOR, LTD.

TREVOR WRIGHT, Managing Director.

THE AERO EXHIBITION.

To the Editor of FLIGHT.

SIR,—I should be glad to communicate with some reader and prospective exhibitor who would be willing to include my propeller in his display, and, preferably, with suitable power available for running it.

I can give him choice of three sizes, viz., 8 ft. 3 in., 6 ft. 7 in., and 5 ft. 6 in. diameters.

Yours faithfully,

York, Feb. 15th. SIDNEY H. HOLLANDS.

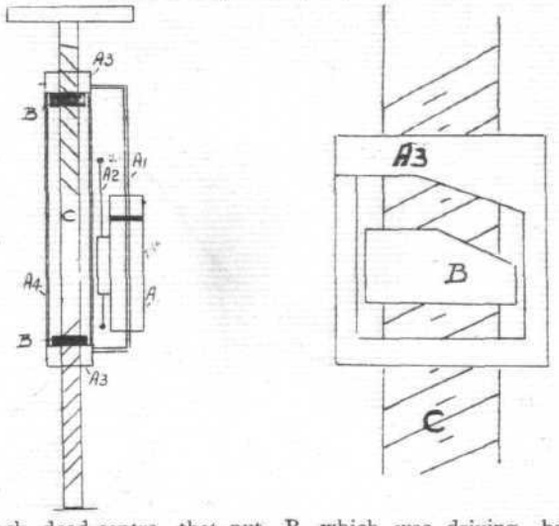
[We would suggest that Mr. Hollands should communicate with the Secretary of the Aero Club, or the S.M.M.T., as every encouragement is to be given for the display of legitimate exhibits. —ED.]

A MODEL ENGINE DESIGN.

To the Editor of FLIGHT.

SIR,—I enclose a rough sketch of an engine which I think might be of use to amateurs in search of an engine for model aeroplanes. It is easy to construct and compact, and gives high speed to the shaft and propeller. It can be driven by compressed air.

The clutches, A^3, which are coupled together by rods, A^4, are driven by means of the piston in cylinder, A, up and down the threaded shaft, C. On the shaft are two units, B, which engage with the clutches, A^3, thereby causing the shaft, C, to revolve. As this detail sketch shows, the clutches are only single-acting and therefore only one nut is engaged in each direction of travel. When a convenient place is reached on the shaft, the engine is reversed through operation of the tappet-rods, A^2, controlling the slide-valve.



At each dead-centre, that nut, B, which was driving, becomes detached from its clutch-face, but is, of course, still retained by the clutch-cage, although now free to revolve with the shaft. The other nut then takes up the work of driving the shaft and is subsequently disengaged in a similar manner. The shaft, C, being cut at the one end with a right-hand thread and the other with a left-handed thread, thus continues to rotate in a uniform direction and great speed of revolution and comparative slow motion in the working parts may, in this way, be obtained.

I invented this engine many years ago as a turbine, with the object of gaining the maximum advantage from the expansion of steam. I protected it with a provisional patent, but never completed it, so that I shall be very glad if it proves useful to any of your readers, as it is simple to construct, and with a thread of 60° gauged as in the Archimedian drill, causes little friction. I am a member of the Aero Club and am much interested in everything relating to flight.

Yours faithfully,

E. B. POTTER.

A "TIP" TO AEROPLANISTS.

To the Editor of FLIGHT.

SIR,—Having been enabled to show aviators that they need not go abroad for propellers, but can get them much better and quicker at home, while encouraging the British industry, I have another hint to offer, which I hope may prove timely and acceptable.

In view of the increasing demand for suitable trial grounds, I would draw the attention of those who are on flight intent, or "who fain would fly to other climes," to an admirably adapted tract of land adjacent to this grand old city of York, where I am at present located.

This excellent tract of country is the York racecourse, a treeless and otherwise unobstructed level area of about a mile and a half by threequarters.

It is certainly the most suitable ground I have seen in England, and I gather that its use would be free of all charge. York is within four hours' rail of London.*

Referring to Mr. Jack Humphry's letter of last week, I thank him for his favourable mention of my propeller. This is due to the fact that Mr. Humphry has not only "heard of the 'Hollands' propeller," but has seen it.

Yours faithfully,

York, Feb. 6th. SIDNEY H. HOLLANDS.

* P.S.—I would gladly obtain full information locally for any who are interested.

Aeronautical Patents Published.

Applied for in 1908.

Published March 4th, 1909.

28,026. R. ESNAULT-PELTERIE. Aeroplanes.